

PATENT
Docket GE138084

REMARKS

Reconsideration of the above identified application is respectfully requested.

Firstly, the office action fails to include a copy of the Form PTO-1449 initialed by the examiner to indicate due consideration by the examiner of the six listed patent references and four listed other references filed along with the original application.

The PAIR system indicates that the form is of record, and as a precaution Applicants are attaching hereto duplicate copies of the four non-patent references listed therein whose receipt thereof by the USPTO is evidenced by the also attached return receipt postcard.

Accordingly, the examiner is hereby requested to return to Applicants in the next office action, a copy of the form PTO-1449 initialed by the examiner for each of the eight provided references to confirm due evaluation thereof under the applicable Rules.

The specification has been amended at para. 30 to conform the sidewall 20 to the suction sidewall as introduced at para. 24, and as illustrated in figures 3 and 4.

The specification has also been amended at para. 41 to correct a syntax error.

Applicants traverse the rejection of claims 1 and 2 under Section 103(a) over Glynn et al, Rinck et al, and Sylvestro et al.

Applicants note the substantial breadth of interpretation of Applicants' claims being proffered by the examiner, which correspondingly enlarges claim scope in later infringement analysis of the file wrapper. However, the examiner has failed to afford due weight to specific features and cooperation of features which distinguish over the applied art.

As the specification expressly states and the references

PATENT
Docket GE138084

of record support, the turbine blade cooling art is quite crowded with myriads of permutations therein in view of the substantial complexity of cooling design and the esoteric nature thereof.

Accordingly, the level of skill in the art would well recognize the common features of blade cooling and the special function and meaning thereof for which the examiner has failed to afford due weight.

On pages 2 & 3 of the office action the examiner attempts to match features from claim 1 with the main reference Glynn, but such matching contains significant errors rendering the rejection unsubstantiated.

For example, at page 3 the examiner states that Glynn discloses "a suction sidewall including a row of diffusion film (44) cooling first holes" This is clearly incorrect, and not supported by any identified evidence in Glynn.

At col. 7, ll. 47+, Glynn clearly teaches "conventional leading edge film cooling or shower head cooling holes 44." There is no teaching in Glynn of any diffusion configuration of these holes 44.

Indeed, figures 2 and 3 of Glynn clearly illustrate that the holes 44 have parallel sides, and therefore constant flow area, and would not have any diffusion capability as would be well known by those skilled in the art, and the examiner has not shown otherwise.

In fact, the examiner has also applied Sylvestro for a different reason, but Sylvestro relates specifically to diffusion-type cooling holes in which the angled sidewalls 86 diverge to form the diffusing region 94 as disclosed at col. 4, ll. 55+, and illustrated in figure 3.

There are no such angled sidewalls of the holes 44 in Glynn, and the examiner has not explained otherwise.

The examiner further errs by contending on page 3 that "said first holes [44] being disposed through said suction

PATENT
Docket GE138084

sidewall at a compound inclination angle (col. 2 lines 30-36)
...."

The examiner has identified no evidentiary support in the detailed description following col. 5, l. 46, of Glynn to support any compound angle, and to the contrary, figures 2 and 3 of Glynn clearly illustrate the single angular orientation of the holes 44, which are illustrated only in horizontal plane, with no vertical inclination whatsoever.

The examiner's reference to "col. 2" of Glynn is in the Background section and pertains to the referenced patent 5,813,836 which is neither relevant to the disclosure of Glynn, nor is being applied by the examiner in the rejection.

The examiner then admits the fundamental shortcoming of Glynn which "does not disclose quadrilateral cross section outlet holes . . .," and then attempts to combine the disparate reference Sylvestro.

The examiner uses figure 5 of Sylvestro for the quadrilateral cross section, and then figure 3 of Sylvestro for the "generally teardrop outlet shape," but this use is clearly erroneous, and neither meets the stringent requirements of MPEP 706.02(j) or ch. 2100 for legal motivation.

The examiner simply opines that "it would have been obvious [to combine Glynn, Rinck, and Sylvestro] . . . to have a quadrilateral cross section and a generally teardrop shape . . . for film cooling with an organized flow."

This clearly does not meet the legal motivation requirements, and is classic hindsight conclusion without regard to the claimed invention in the whole or the references in the whole.

Quite fundamentally, Sylvestro relates specifically to cooling of the trailing edge of a turbine airfoil and the associated cooling holes 84, 94, 96 thereat. Note that the remainder of the airfoil illustrated in figure 2 is imperforate.

PATENT
Docket GE138084

In Glynn, the airfoil includes various rows of holes from leading to trailing edge, and is not imperforate in the manner of Sylvestro. And, quite significant in Glynn is the expressly disclosed cooling slots 46 at the trailing edge.

The examiner has not explained why the trailing edge holes in Sylvestro would be relevant, not to the related trailing edge holes 46 in Glynn, but instead to the unrelated shower head holes 44. The examiner's combination is clearly selective without regard to context, and without regard to one of ordinary skill in the art, and is clear evidence of impermissible hindsight.

Furthermore, the examiner's interpretation of Sylvestro is incorrect. The examiner uses figure 3 of Sylvestro for the "teardrop outlet shape" because claim 1 recites the teardrop shaped outlet 46.

But where in figure 3 of Sylvestro is any such "teardrop outlet shape?"

Note that region 96 is uncovered and is not quadrilateral and is not teardrop shaped.

Note that region 94 is covered, but is clearly rectangular without teardrop shape itself.

So where is any relevant teardrop shape in Sylvestro as used by the examiner? Sylvestro at col. 4, ll. 35+, clearly teaches that "Each of the flow dividers is teardrop shaped," but claim 1 does not recite any such flow divider.

In claim 1, the first hole 42 has a teardrop shaped outlet 46.

In Sylvestro, the teardrop flow dividers define the outlet holes 84, 94, 96 which have the same configuration in both figures 5 and 3 being used by the examiner, and that configuration is only rectangular and diverging without any teardrop shape to the hole as distinguished from the flow dividers which define that hole.

Furthermore, the examiner has overlooked the claim 1 recitation that the teardrop shaped outlet 46 is formed "in a

PATENT
Docket GE138084

convex contour of said suction sidewall."

In Sylvestro, the hole 84,94,96 is formed on the concave pressure side of the airfoil, and the trailing edge appears to be locally flat in figures 4 and 5 of Sylvestro.

As indicated above, turbine airfoil cooling is quite esoteric and complex. Note the fundamental airfoil configuration of the blade in Applicants' figures and in the figures of the applied references which broaden from the leading edge and narrow to the thin trailing edge for effecting the different pressure distributions on the opposite pressure and suction sides of the blade.

This airfoil configuration is fundamental to one of skill in the art, and the placement of cooling holes must be carefully analyzed for the different locations thereof between the leading and trailing edges.

Clearly, the leading and trailing edges of the airfoil could not be any more different from each other, and the examiner's attempt to substitute features of the trailing edge holes of Sylvestro for features of the leading edge holes in Glynn has no legal or logical or technical support.

As for the examiner's mere contention of "organized flow," such contention is without any disclosed relevancy to any problems in Glynn or Sylvestro or Rinck, and without regard to the whole evaluation of these references or claim 1 being rejected. Such "organized flow" clearly is not the legal motivation required in the MPEP, but is an impermissible expedient of prosecution before the USPTO.

And, indeed, such organized flow in the trailing edge holes of Sylvestro has no disclosed relevancy to the leading edge holes of Glynn, and the examiner has not explained otherwise.

MPEP ch. 2100 well explains the required analysis under Section 103, and the evaluation of claims in the whole, and references in the whole, and the problems addressed and solved by applicants.

PATENT
Docket GE138084

Where then in the three disparate references being applied by the examiner are any relevant problems addressed for which the solutions of these references would have been combined in the first instance by one skilled in the art?

Without Applicants' claims as the guide the examiner, or one skilled in the art, would not know what to take from each reference, what to disregard, and how to combine any such features, or in what combination.

At best, the three references, like the myriad of references available to the examiner, provide mere parts bins from which naked elements might be selected and combined, but for what reason? For what legal motivation?

For "organized flow?" What does this mean in the context of any of the three references? Of course, cooling holes are provided in turbine airfoils for "cooling." So, why not simply contend that the disparate references could be combined for "improved cooling?"

The examiner's "organized flow" contention is plainly irrelevant to the other references being combined, and overlooks the specific problems being solved by the Applicants.

Note that Applicants' Background section clearly explains that a local cooling problem has been uncovered, or discovered, at the end of the life of very long-lived turbine blades. And, Applicants are now claiming a solution specific thereto.

See MPEP 2141.02 which address the significance of applicants' discovery of a problem in evaluating the whole invention of the claims. Note also that this discovery is expressly addressed in paras. 14, 51, & 52 of the specification, for example.

Why then would one skilled in the art presented with the references being applied, or any other relevant reference, combine them in the manner recited in Applicant's claims for a special combination and for special performance in a

PATENT
Docket GE138084

specific localized area of the airfoil? Why, especially when only the very long time use of conventional turbine blades in an operating gas turbine engine revealed the specific problems being solved?

The likelihood of one skilled in the art being presented with the same problem from the same long time use of a turbine blade is at best improbable, and more likely, impossible.

Why then, would one skilled in the art select various features from disparate references and combine them in the manner of Applicants' claims?

For "an organized flow" as opined by the examiner is so patently general and irrelevant to the very references being applied, as to be evidence in and of itself of the non-obviousness of the claims being rejected.

For even with the considerable advantage of hindsight available to the examiner in first reading Applicants' specification and claims, and then searching the crowded art, and then analyzing that art, and using the best references available to the examiner in accordance with Rule 104, the examiner's simplistic rationale is to combine the disparate references for "organized flow."

And, to combine the trailing edge features on the pressure side of one reference with the leading edge features of another reference on the suction side? The plausibility to one skilled in the art could not be any more unlikely, and wholly disregards the esoteric nature of modern turbine airfoil cooling designs, of which the prior art is remarkably crowded.

No issued patent in airfoil cooling could pass the examiner's general test of "organized flow," rendering all the patents in the airfoil cooling arts unenforceable.

However, MPEP ch. 2100 is to the contrary. The analysis under Section 103 must be rigorous; must be based on identified evidence; must evaluate claims and references in

PATENT
Docket GE138084

the whole; and must be supported by identified legal motivation relevant to identified problems or reasons to combine references in the first instance.

In view of the many errors in evaluating the features of claim 1 and those of Glynn, Rinck, and Sylvestro, the rejection of claim 1 lacks evidentiary and legal support, and therefore is without merit.

The examiner has overlooked claim 2 which recites a uniform inlet 44 followed by the teardrop outlet 46 diverging therefrom.

In Glynn, the holes 44 appear constant from inlet to outlet.

Similarly, the holes in figure 2 of Rinck appear constant from inlet to outlet.

In Sylvestro, there are no relevant leading edge holes illustrated in figure 2, and the covered region 94 is clearly rectangular and not teardrop in shape, and the uncovered region 96 is not quadrilateral or teardrop in shape.

Accordingly, withdrawal of the rejection of claims 1 and 2 under Section 103(a) over Glynn et al, Rinck et al, and Sylvestro et al is warranted and is requested.

Applicants traverse the rejection of claims 11 and 12 under Section 103(a) over Glynn et al and Sylvestro et al.

The examiner has merely repeated verbatim the contentions made in the previous rejection, as now applied to the corresponding features of claim 11 & 12.

For the same reasons presented above, the examiner has failed to establish even a *prima facie* showing.

Accordingly, withdrawal of the rejection of claims 11 and 12 under Section 103(a) over Glynn et al and Sylvestro et al is warranted and is requested.

Applicants note the allowability of claims 3-10 and 13-27, which will have the correspondingly broad interpretation thereof in accordance with the examiner's broad interpretation of the claims from which they depend.

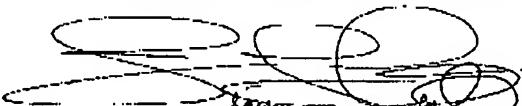
PATENT
Docket GE138084

In accordance with the duty imposed by 37 CFR 1.104 and MPEP sections 707, 707.05, 707.07, and 707.07(g), the examiner is requested to reconsider all the art of record, including the references originally cited by the Applicants, to ensure full compliance with the required thoroughness of examination.

In re Portola Packaging, Inc., 42 USPQ2d 1295 (Fed. Cir. 1997) emphasizes the importance of complying with this duty to ensure that all references of record have been fully considered by the examiner in the various combinations thereof. And, the Board of Appeals has further elaborated on the importance of this examiner duty in Ex parte Schriker, 56 USPQ2d 1723 (B.P.A.I. 2000).

In view of the above remarks, allowance of all claims 1-27 over the art of record is warranted and is requested.

Respectfully submitted,



Francis L. Conte
Registration No. 29,630
Attorney for Applicant

Date: 16 June 2005

6 Puritan Avenue
Swampscott, MA 01907
Tel: 781-592-9077
Fax: 781-592-4618

Attachment: References AR,AS,AT,AU & return postcard